

hairs clothing the tail, brown, with numerous interspersed fine black hairs; under surface greyish-white, becoming much lighter and forming a conspicuous patch immediately beneath the tail; whiskers black; feet light brown; base of the whole of the fur bluish-grey.

Length from nose to base of tail	4 inches.
——— of the tail	$3\frac{1}{4}$ „
——— of the fore-arm	$\frac{1}{2}$ „
——— of the tarsus and toes	$\frac{3}{4}$ „

This animal is known to the Aborigines of Moore's River in Western Australia by the name of *Jilbeetch*.

On the part of Dr. Gray, Mr. Gould brought under the notice of the Meeting a new and very distinct species of *Hapalotis*, which is nearly allied to, but considerably exceeds in size, the *Hapalotis melanura*. This animal was collected by Mr. Elsey in the interior of Australia during the recent expedition from the north-west coast of Australia to Moreton Bay. It is a harsh wiry-furred animal, and differs from *H. melanura* not only in size, but in the apical half of the tail being white.

HAPALOTIS HEMILEUCURA.

Head, all the upper surface, and flanks very light sandy-brown, with numerous, but thinly placed, fine long black hairs; under surface buffy-white, with even lighter feet and fore-arms; tail brown, deepening into black about the middle, beyond which the apical portion is white; the white hairs being prolonged into a small tuft at the tip.

Length from nose to base of tail	8 inches.
——— of the tail	$6\frac{1}{2}$ „
——— of the fore-arm	$1\frac{1}{2}$ „
——— of the tarsus and toes	$1\frac{1}{2}$ „

2. OBSERVATIONS ON THE GENUS FURCELLA, OKEN, A CONCHIFER WITHOUT CONCHA OR NORMAL VALVES, AND ON THE GENERA TEREDO AND CILÆNA. BY JOHN EDWARD GRAY, PH.D., F.R.S., V.P.Z.S. ETC.

(Mollusca, Pl. XXXIX.)

The shelly tube of this animal has been described under several names. Linnæus considered it as a *Serpula*; Pallas, Home, and more recently Messrs. Adams have regarded it as a *Teredo*. Oken (1815) considered it a genus under the name of *Furcella*, to which the following names have been given:—*Septaria*, Lamk., *Clossonaria*, Férussac, *Clausaria*, Menke, *Kuphus*, Gray, altered to *Kyphus* by Agassiz.

There is no doubt that it is allied to *Teredo*, and it has been separated from that genus by the older conchologists because the apex

of the tube is solid and furnished with two separate tubular apertures, evidently for the siphons of the animal, which in some specimens are said to be produced beyond the end of the larger tube into two slender, elongated, cylindrical tubules, as figured by Rumphius; hence the name given to it by Oken: but I have never seen a specimen which exhibited this character.

The habit of the animal at once separates it from *Teredo*, which always lives in wood, while the *Furcella* lives sunk perpendicularly in the sandy mud of the tropical seas.

The external appearance of the shelly tube agrees with this habit; for instead of being nearly cylindrical and more or less twisted according to the hardness or knots in the wood, it is club-shaped and closed at the larger end with a convex plate like the tube of *Chæna numia*, which lives in the sand in a similar manner; but the tube of the *Furcella* is much larger, and generally rather distorted and irregular on the surface, divided into sections by more or less distinct constriction of its diameter or by the slight alteration in the direction of the tube, marked *a, b, c*, on the Plate, which on examination are evidently produced by the periodical stoppages in the growth of the animal, which at each period of suspended activity evidently closes up the end of the tube; the animal absorbs this terminal plate when it again returns to activity, and requires a larger tube for its increasing dimensions. In the specimen before me, the space between these interruptions in growth increased in length as the animal grew and enlarged in diameter.

The tube is thickened above as the animal leaves it, and is much thinner near the lower or closed extremity. The whole length of the tube is solid, without any perforations, except quite near the closed end, where it is pierced with a number of unequal-sized rather irregularly disposed small perforations, generally scattered; but sometimes there is a short series of five or six placed in a longitudinal line, and these holes appear to be filled up by an internal coat when the animal absorbs the end and lengthens its tube.

The larger end of the tube is entirely closed over by two convex, arched, shelly laminæ, continuous from each side of the tube, and meeting and slightly overlapping one another in the central line, which is opposite to the septum between the two tubes in the smaller end of the shell-sheath of the animal.

These small holes are evidently intended for admission of water to the animal, and the shelly septa at the bottom to protect the animal from the sand in which it lives. The holes are similar to the tubes of *Penicillus aquarius* and *Clavagella*, which live in sand, and *Bryopa melitensis*, which lives in porous stone.

I have not observed any similar perforations in the tube of the *Teredo*; and indeed they would not be of any use, as the tube is deeply sunk in the substance of the wood in which they burrow.

The *Teredines* appear during their period of rest to close the end of their tube, with a shelly septum formed of a single convex plate. There are two fragments of tubes in the British Museum which appear to belong to that genus, from their external appearance and

prismatic structure, which are so closed at the bases : in one specimen the closing septum is uniformly convex, and like the tube-structure ; in the other the septum is divided into two equal portions by a transverse groove or depression ; but on neither of the specimens can I observe any traces of the septum being formed of two plates overlapping in the middle like the septum of *Furcella*.

The calcareous tubes of *Septaria*, mentioned by Home, Phil. Trans. 1806, p. 276, Dillwyn, R. Shells, ii. p. 1088, and in the 'Mag. Nat. Hist.' 1838, p. 408, as having a succession of *Septa*, proved on re-examination, Mr. Woodward informs me, to be the shell of *Vermeti*.

The character of the Family *Teredinidæ* is, that the animal always lives in a tube ; that it is provided with two appendages, one on each side of the siphons called *palettes*, which differ considerably in structure in the different genera ; and that the front of the body of the animal over the mouth is encased in two very small valves like those of a *Pholas* in structure and form, but in a more rudimentary state of development ; the tubular case of the animal, apparently taking the place or being in fact a great development of the dorsal additional shelly plate usually found more or less developed in the different genera of *Pholadidæ*.

Now it is clear that by Pallas, Home, and Messrs Adams referring this shelly tube to the genus *Teredo*, they believed that it had all these peculiarities.

I was, therefore, very much pleased when a perfect specimen of this interesting genus came into my hands yesterday, to believe that I might have the opportunity of bringing before the Society the palette and valves of this genus, which until now have been desiderata, especially as the sound made by shaking the tube showed that some shelly pieces were contained within it.

But on making a small aperture on the side near the base of the tube to examine the structure of the valves, I was astonished to find that, though the genus had two of the characteristics of the family of *Teredinidæ*, it wanted one of them ; the plates within were only the *palettes*, which are simple and somewhat like those of the more common *Teredo norvegica*, and that there were no proper shelly valves, not even any rudiments of them ; and that the animal forms a genus in that family which has the abnormality of wanting the true shelly valves which are so universal in the *Conchifera*.

The reason of this absence may be explained by the fact that the animal does not require them to protect its head and nervous centre, living as it does in a soft sandy mud ; while they are required in *Teredo* and the allied genera which have to bore their way into hard wood or stone to form the hole that is to be lined with the shelly tube.

Sir Everard Home in his 'Lectures,' when describing the animal of *Teredo navalis* (ii. t. 81), refers this shell-tube to the genus *Teredo*, and gives a very good figure of the *palettes*, or as he called them, "operenlum," of it (tab. 81. f. 4 & 5), but he was not aware of this absence of the shelly valve ; for he figures what he considers the "boring shell of the same *Teredo*" (fig. 6) : but what he has

here taken for the "boring shell," or true valves of the animal, is evidently a fragment of the plates which closes the end of the tube.

It may be supposed that, perhaps, the valves might be very small and had fallen out; but I think it is impossible, as the holes at the narrow part of the tube are very small and scattered with fragments of shell and sand. The tube otherwise is quite closed, and the animal had evidently been eaten out by dipterous larva, as there were abundance of the cases of their pupa-skins in the cavity.

I may observe, that in the genus *Penicillus*, Brug. (*Aspergillum*, Lamk.), which also lives in sand, and has a fringe of tubes round the convex base of the tube, the shelly valves are immersed in the substance of the tube; but *Furcella* is the only genus of bivalve shells I am acquainted with that is entirely destitute of true valves, like the *Tunicata*.

The possession of the two separate apertures at the upper extremity of the tube does not appear to be exclusively confined to this genus; for in the British Museum we have three specimens of tubes which belong to *Teredo norvegicus*, or to a species allied to it, procured at the same time probably from the same place, but without any habitat.

They all have a succession of transverse laminae at the upper extremity of the tube. In No. 1 these plates are pierced with an oblong central hole for the passage of the siphons, as is the case with most specimens of *T. norvegicus*. No. 2 is similar, but there is a projection on one side of the perforation of the plates dividing the aperture on that side into two parts; and in No. 3, instead of having a single oblong aperture as in the other specimens, there are two sub-circular ones separated by a central transverse septum as in *Furcella*, as if the imperfect rib in No. 2 was transformed into a shelly plate extending right across the aperture, and which must be deposited between the two siphons of the animal.

In general the tubes of *Teredo* are entirely imbedded in the wood, but sometimes, as in a specimen we have in the Museum from the mouth of the River Nunn, the apices of the tubes of the shell project as if they were produced by the animal as the shelly tube enlarged beneath; but I believe this arises from, and at least is probably, if not entirely, produced from the surface of the wood disintegrating and leaving the apices of the tubes exposed. In the same collection are a series of the tubes of a species of *Teredo*, from Van Diemen's Land, which are more or less covered with *Serpulae* and *Vermeti*; I suspect these must be specimens which have been partially or entirely exposed by the rotting of the wood in which they were enclosed.

These specimens from Van Diemen's Land, so covered with *Serpulae*, also exhibit another peculiarity: in one case two tubes are parallel to each other, and firmly united by the outer surface of one of their sides into one body, which induced me to believe that they might be *Serpulae*, until I examined the structure of the shell and observed the simple contracted apex of the upper extremity.

In those genera of *Teredinidae* which have a number of half-septa

across the upper or smaller aperture of the tube, forming a kind of incompletely valvular structure on the sides of the siphons, or as in *Furcella*, where the space between the siphons is entirely closed up, leaving only a tube for the passage of the siphon on each side of the upper cavity, these septa and the solid calcareous matter forming the tubes must be deposited by the surface of the siphons themselves, as the canal of the univalve *Zoophagous Gasterops* is deposited by the siphon of the mantle of these animals.

And as the *palettes* or *opercula*, as they have been erroneously called, of this family, are fixed on each side between the base of the two more or less elongated siphons, in all those genera, which have a siphonal septum like *Furcella* or lamina like *Teredo* at the apical end of the tube, these *palettes* are always enclosed in the tube, and cannot be exerted as they are sometimes represented.

The character of this genus must be thus amended :—

FURCELLA.

Animal without any true shelly valves; siphonal palettes distinct, large; apex dilated, transverse, spatulate, with a central midrib and an elongated slender cylindrical base.

Tube clavate, irregular, sometimes bent; apex with two tubular siphonal apertures separated by a broad hard shelly longitudinal dissepiment; base pierced with small scattered perforations; end inclosed by two overlapping convex septa, arising from the sides and completely closing the ends.

These arched terminal plates appear to be absorbed before each period of activity, and the end is again closed with similar plates at each period of rest, after a sufficient elongation and enlargement of the tube for the protection of the enlarged animal. Living sunk in sandy mud on the shore in tropical climates.

The perfect specimens of *Chæna mumia* are covered with a thin external coat (sometimes covered externally with particles of sand and Foraminifera, which are imbedded in its surface), which is only partially attached to the general substance of the tube by thin lines, concentric with the lines of growth, leaving the rest of the coat separated from the surface of the tube by a distinct hollow space.

In some specimens, as those in the British Museum from Mozambique, the attached part of the outer coat is in nearly concentric ring-like transverse lines round the tube, leaving a more or less complete hollow ring between each attached portion. In others, as that from the Philippines in the same collection, the attached portion of the outer coat is oblique and interlaced so as to leave only narrow, elongated, oblong, hollow tessellated interspaces on the surface, which are acute at each end.

I am not certain that these characters are permanent; but if so, one may be called *Chæna annulosa*, and the other *Chæna tessellata*. In the latter the outer coat is simple and smooth externally. In the specimen from the Philippines the tube is covered with a close coat of sand and a few Foraminifera, which are deeply imbedded in

— added 1847

the substance of the thin outer coat, giving it a very peculiar appearance.

The shell on the newly hatched animal, which remains as a nucleus on the coat of the older shells, is smooth, uniformly convex, without any appearance of the anterior truncation or of the radiating ridges, which is so peculiar in the adult shells; and it seems also to have a straight lower edge without any appearance of the large ventral gape of the genus.

The cavity of the tube is contracted by an internal ring just above the hinder end of the shells, leaving an oblong central aperture of about half the diameter of the tube. This contraction is formed of several shelly plates with interspaces between them.

The animal has the power of repairing a fracture of the tube. There is a specimen in the Museum which had evidently been completely broken across about half its length, and the direction of the tube altered; the two portions have been united by an internal irregular white shelly coat.

EXPLANATION OF PLATE XXXIX.

Fig. 1. *Furcella gigantea*, half the natural length; *a, b, c, d, e*, the remains of former closing of the tube.

Fig. 2. *Furcella gigantea*, view of terminal closing of the tube; of the natural size.

Fig. 3. Palettes, showing the inner and outer sides.

Fig. 4. *Chæna annulata*, enlarged.

Fig. 5. *Chæna tessellata*, enlarged.

3. REVIEW OF THE SPECIES OF THE FISSIROSTRAL FAMILY MOMOTIDÆ. BY PHILIP LUTLEY SCLATER, M.A., F.Z.S. ETC.

(Aves, Pl. CXXVIII.)

Considerable additions have been made of late years to this rather peculiar family of birds, of which one member only was known to Linnæus; and there are now at least sixteen or seventeen different Motmots, of which examples occur in European collections. Two or three very interesting articles have been written upon the habits and certain structural peculiarities of these birds; but no modern writer except Lesson, in his little-known volume, entitled 'Description des Mammifères et Oiseaux' (where descriptions of eleven species known to the author are given), has attempted a complete review of the species. The following paper has been drawn up with a view to meet this deficiency, and to bring together in one place short characters sufficient for distinguishing these birds, so as to obviate the necessity of referring to all the different publications where the species were originally described.

Latham's term *Momotus*, being long precedent to Illiger's *Priornites*, which is sometimes employed for this group, has every claim for adoption. I therefore propose to call the group *Momotidæ* (as